education which leaves a young man, at the conclusion of his course, unable to speak or write his own mother tongue fluently and correctly."

There is, we are aware, an ever-increasing desire on the part of Indians to see the vernaculars encouraged and developed; for a long time Englishmen also have aimed at fostering the development of vernacular literatures, and post-graduate research in the vernaculars is already a recognised branch of study. But it is, we feel, important to keep distinct the two objects in view, namely, (1) to provide the best education for schoolboys, and (2) to cultivate the vernacular languages.

Space will not permit us to discuss at any length the cognate subject of the teaching of English, but it may fairly be claimed that hitherto university instruction in English has been conducted on unpractical lines. Textual analysis of seventeenth-century literature on the part of students who have not mastered the modern idiom tends to unintelligent cram. What is wanted is the more rapid perusal of standard modern works. Nothing can be more pitiable than to see a class of Indian students taking down verbatim notes (always in English) from a lecturer on such a book as "Samson Agonistes." This is not the way to learn English for practical purposes, which is the main object of all except those who take English as a subject for their degree. It is satisfactory to note that the Sanskrit College and the Madrasahs have received ample treatment by the Commission, and are to be placed on a better footing.

We have not space to deal now with the important proposals of the Commission in regard to the organisation of the University of Dacca, the reorganisation of the University of Calcutta, and their many recommendations in regard to examinations, women's education, medical education, agricultural education, engineering and technological education, and Oriental studies. We can only congratulate the Commissioners on the admirable report they have produced, and express a hope that their main proposal, the Board of Secondary and Intermediate Education, may become before long a practical reality.

E. DENISON ROSS.

NOTES.

ONE of the most useful functions that can be performed in these days of minute specialisation of scientific research is the promotion of meetings at which workers in various fields can discuss subjects of common interest. Since Sir Robert Hadfield became president of the Faraday Society in 1914, fifteen such discussions have been held, the last, of which an account is given elsewhere in this issue, being in the meeting-room of the Royal Society on January 14, in association with the Royal Microscopical Society, the Optical Society, and the Photomicrographic Society. Sir Robert Hadfield and the secretary of the Faraday Society, Mr. F. S. Spiers, are to be heartily congratulated upon the great interest taken in this discussion, the subject of which was "The Microscope: Its Design, Construction, and Applications," and the exhibition of instruments connected with it. There were meetings in the afternoon and evening, and on both occasions it is scarcely too much to say that as many people were unable to find places in the meeting room as those who filled it to the doors. With characteristic generosity Sir Robert Hadfield entertained a large company to dinner at the Ritz Hotel between the two meetings. The whole session was most successful and encouraging to all who are interested in the advance of British optical science, both theoretical and applied. By organising such joint meetings the Faraday Society is indeed promoting the best interests of both science and industry, and doing what might be undertaken even more appropriately by the Royal Society itself.

AN interesting pamphlet on the work of Faraday and the Faraday Society was prepared by Sir Robert Hadfield in connection with the joint discussion on the microscope held on Wednesday, January 14. It appears that the Faraday Society was chiefly responsible for the appointment of a special Nitrogen Products Committee by the Munitions Inventions Department, and this Committee was, in turn, instrumental in establishing a research department, which provided much valuable information for the practical consideration of sources of nitrogen supply when the submarine campaign made the subject a matter of national concern. One of the members of the council of the society, Dr. J. A. Harker, was entrusted with the direction of this work, and the final report of the Nitrogen Products Committee, which has just been published (Cmd. 482, 4*s*. net), is a most substantial survey of the position of supplies of nitrogen compounds and the practical problems involved in the establishment of processes for nitrogen fixation in this country. Referring in the pamphlet to his own particular lines of work, Sir Robert Hadfield mentions that Faraday, in his experiments on alloys of iron with other elements carried out in 1821 and 1822, was the pioneer of the great technical advances which have been made in alloy steels during the past thirty years. It was Sir Robert's own discovery and invention of manganese steel in 1882 which led others to explore the rich field first entered by Faraday, and has resulted in the production of chromium steel, silicon steel, nickel steel, tungsten steel, and many other types.

THE recent death of Dr. John Wilson, lecturer in agriculture and rural economy in the University of St. Andrews, robs the University and science of a keen and brilliant agricultural biologist. Dr. Wilson was one of the few who regarded agriculture as a sister science of biology rather than as a branch of chemistry, and his work on the improvement of farm crops has borne excellent fruit. Whilst demonstrator in zoology he devoted considerable attention to the development of the common mussel, and published an elaborately illustrated memoir on the subject, but his name will be more permanently associated with his successful investigations on the improvement of such plants as the potato turnip, and oat. He raised an enormous number of new varieties. Amongst those of the potato were many of exceedingly fine quality and disease-resisting properties, and they have been taken up by growers all over the country. His most successful varieties in this connection were perhaps Templar, Bishop, and Rector. Dr. Wilson's experimental work on oats was equally successful, and he was hoping shortly to place on record a full account of his investigations. Many other plants at different times claimed his attention with equally interesting results. Handicapped by lack of means and assistance, he never spared himself. His unflagging enthusiasm and remarkable energy deserved better and more liberal support, and had it been forthcoming there is not the slightest doubt that the nation would have greatly benefited by his researches.

FATHER JOHANN NEPOMUK STRASSMAIER, S.J., the distinguished Assyriologist, who died on January 11 at the Jesuits' Church, Mount Street, London, W., was born in Bavaria in 1846. Soon after the beginning of Bismarck's *Kulturkampf* against the Catholic Church in Germany, Strassmaier left his native land in 1872 and came to England, where he remained for the rest of his life. From his early youth he had been deeply interested in Oriental studies, and in London his attention was soon directed to the numerous Babylonian tablets in the British Museum, which had not yet been interpreted and translated, and among which were many astronomical texts. Strassmaier was fortunate enough to become associated with Father Epping, S.J., who undertook the necessary calculations and the scientific discussion of the texts interpreted by Strassmaier. The first results of their labours were published in a book, "Astronomisches aus Babylon" (1889), which was followed by several papers in the *Zeitschrift für Assyriologie*. They showed clearly that the astronomers of Babylon during the two or three centuries before Hipparchus (if not earlier) possessed a considerable amount of accurate knowledge of the motions of the sun, moon, and planets. Epping died about 1895, but some years later his work was taken up by Father Kugler, who published his "Babylonische Mondrechnung" in 1900, and began to issue his great work, "Sternkunde und Sterndienst in Babel," in 1907. Kugler repeatedly bore testimony to the great patience and skill of Strassmaier in deciphering many text, which but for him might have remained unread for ever, as they were gradually deteriorating owing to damp and other climatic influences.

THE Lord President of the Council has approved the appointment of Col. Sir Frederic Nathan, K.B.E., late R.A., to be Power Alcohol Investigation Officer under the Fuel Research Board of the Department of Scientific and Industrial Research. The appointment of the Power Alcohol Investigation Officer has been made as a result of the consideration given by the Committee of Council for Scientific and Industrial Research to the report of the Interdepartmental Committee on the Production and Utilisation of Alcohol for Power and Traction Purposes, which recommended the establishment of a small permanent organisation under the Department of Scientific and Industrial Research to continue investigations into these problems. The Fuel Research Board proposes to begin by bringing the work already being done as regards both the production and the utilisation of alcohol into proper focus. Sir Frederic Nathan, who before the war was Superintendent of the Royal Gunpowder Factory at Waltham Abbey, and later works manager of Messrs. Nobel's Explosives Factory, Ardeer, was the officer in control of alcohol under the Ministry of Munitions during the war, and chairman of the Production Section of the Interdepartmental Committee referred to above. Prof. Pierce Purcell, who was Secretary of the Irish Peat Inquiry Committee, has also been appointed to act as Peat Investigation Officer under the Fuel Research Board. The duties of the Peat Investigation Officer will be to keep the Board informed of all progress in connection with research into the utilisation of peat, to continue and extend experiments on the mechanical cutting and winning of peat, and to make arrangements for careful tests of the use of peat as a fuel under boilers.

PROF. R. T. LEIPER, reader in helminthology in the University of London, has been awarded the Straits Settlement gold medal by the Senate of the University of Glasgow. The medal was founded some years ago by Scottish medical practitioners in the Malay States, and is given periodically to a graduate in medicine of the Scottish universities for a thesis on a subject of tropical medicine.

THE council of the British Medical Association is prepared to consider an award of the Middlemore prize (value 50*l.*) and an illuminated certificate for the best essay on "Perimetry (inclusive of Scotometry): Its Methods and its Value to the Ophthalmic Surgeon." The competing essays must reach the Medical Secretary of the Association, 429 Strand, W.C.2, on or before April 30 next.

MR. C. T. KINGZETT writes to suggest that airmen rising to great altitudes should carry bottles of water which, by being emptied at such heights, could then be sealed, and would enable samples of the air there to be secured for purposes of analysis. The late M. Teisserenc de Bort obtained specimens in this way and had them analysed, but found no difference from normal air. His specimens were obtained from registering balloons beyond the reach of any manned balloon or aeroplane. Glaisher no doubt also obtained air from the highest points he reached in his ascents about 1862.

THE death of Mr. Alexander Izat on January 2 is announced in *Engineering* for January 16. Mr. Izat joined the Indian Public Works Department in 1863, and had much to do with the development of the Indian railways. For several years he was on the Legislative Council of the Lieutenant-Governor of the United Provinces; he was made a Companion of the Indian Empire in 1898, and served for several years as a member of council of the Institution of Civil Engineers. At the time of his death he was in his seventy-sixth year.

WE learn with regret that Prof. George Macloskie, professor of biology, Princeton University, U.S.A., died on January 4 in the eighty-fifth year of his age. Prof. Macloskie was born at Castledawson, Ireland,

and educated at Queen's University, Belfast, from which he received degrees in both law and theology. During his student days he was twice a gold medallist of the college. He was called to Princeton in 1875, during the administration of President McCosh. Since 1907 Prof. Macloskie had been professor emeritus of biology in Princeton University. He is best known for his work on the flora of Patagonia.

The *Times* of January 21 contains the following announcement with reference to the Dartmoor hydro-electric supply scheme:—"In deference to the opposition from the Duchy of Cornwall and the Devon County Council, the promoters have decided to drop that part of the Hydro-electric Bill by which they sought to utilise Dartmoor water for generating electricity. They will modify the Bill to restrict their powers to erecting overhead mains for supplying to consumers such surplus power beyond the requirements of their proposed copper-refining industry in mid-Devon, which they produce from lignite beds they intend to develop."

Strong earthquakes continue to be felt in Mexico. At La Fragua, in the State of Puebla, shocks have been almost continuous since the great earthquake of January 3. At Coatzlan, another shock occurred on January 9, by which the destruction of the town was completed. San Joaquin, a village of 3000 inhabitants in the State of Vera Cruz, was destroyed by an earthquake on the morning of January 12. On January 8 the volcano of San Miguel, 35 miles north-east of Cordoba, broke into eruption; streams of lava flowed down the south-east side of the mountain, destroying villages and ranches.

According to the Bulletin of the Science Division of the Royal Academy of Belgium for March, 1919, at the meeting on March 1 it was decided:—(1) To break off relations and exchange of publications with the scientific societies of Germany, Austria, Hungary, and Turkey. (2) To employ only booksellers to procure such publications as shall be considered strictly necessary, whatever be the additional cost involved. (3) Not to send any publication to the men of science of the above nations. (4) To decline and return to the societies or authors of the above countries any publications sent to the academy.

An interesting interview with Prof. Einstein appeared in the *Daily Chronicle* of January 15. A German by birth, Prof. Einstein went to Switzerland in his early youth, where he became naturalised. For some years he was professor of physics at the Federal Polytechnikum in Zürich, and for a short time also at the University of Prague. Shortly before the outbreak of war he was "called" to the University of Berlin, where he is still working, being at the same time director of the Kaiser Wilhelm Institute for Physical Research. Now little more than forty years of age, this eminent man of science conceived the outlines of the theory of relativity at the early age of eighteen, and presented his special theory to the scientific world at the age of twenty-seven. Prof. Einstein regards Prof. Lorentz (Leyden) as his "co-operator" in the special theory of relativity. He points out that, far from vitiating the results of Newton, the theory of relativity rather enhances the greatness of this genius. Though these new ideas will not overthrow the general conceptions of mankind, they will leave their impress on men's thinking in the philosophical and allied sciences.

For some years there has been a vigorous Phytopathological Society in the United States, and recently a Canadian branch of this has been formed, the first annual meeting being held in Ontario. Dr. A. H. R. Buller, formerly of Birmingham University, and now professor of botany in the University of Manitoba, was elected president for 1920. Dr. E. C. Stakman, of Minnesota, was the guest of the society, and gave an account of the very valuable investigations which he and his colleagues have carried out into the races of cereal rust fungi and their bearing on the problems of immunity and susceptibility to disease. Among the attractive list of papers presented to the meeting, those of Mr. J. E. Howitt on "Leaf-roll and Mosaic of Potatoes" and of Mr. Paul A. Murphy on "Diseases of Potatoes which Cause the Running Out of Seed" may be mentioned. Both are welcome additions to our very meagre knowledge of extremely obscure subjects of primary importance. There is in this country no society devoting itself exclusively to phytopathology, and perhaps this is well, for we possess already more than enough small specialised organisations running a precarious separate existence. The need is not for increase in their number, but for some kind of amalgamation or federation of those now existent. The study of diseased crops is merely one branch of applied biology, and this subject is excellently catered for by the Association of Economic Biologists, which performs valuable work in synthesising all the many aspects of investigation which centre round the economic utilisation of plants.

Powell's classification and map of the linguistic families of America allotted twenty-two families, or parts of families, to California. This classification has hitherto been generally accepted. But in recent years the study of these dialects has been fully investigated by Messrs. R. B. Dixon and A. L. Kroeber, the results of their work being now published in the University of California Publications in American Archæology and Ethnology (vol. xviii., No. 3, September, 1919). It has now become possible to regroup these dialects into seven main groups. The most important of these are the Penutian in the north-western region and the Uto-Aztekan to the south-west. The remaining language-groups form a sort of fringe round the two greater groups, the most important being the Hokon, and of less extent the Algonkin, Athabaskan, Yokian, and Lutuamian. Full grammatical details on which this new classification is based are given by Messrs. Dixon and Kroeber.

Mr. J. W. Gowen has made (*Genetics*, May, 1919) a biometrical study of the phenomenon of heredity known as crossing over, basing his conclusions on extensive data derived from the behaviour of the Mendelian factors in the third chromosome of *Drosophila melanogaster*. It is shown that double crossing-over is an extremely variable phenomenon. The reduplication hypothesis is regarded as definitely disproved, and all detailed interpretations are based upon the structure of the chromosomes. Crossing-over between two fixed points on a chromosome is found to be highly variable. It is also found that a change in genes between two fixed points in the third chromosome slightly disturbs the ratios of crossing-over between those points. Biometric analysis shows that the results are all in harmony with the hypothesis that the factors are represented by particles arranged along the chromosomes. A cross-over in one region of the chromosome is more likely to be accompanied by a cross-over 25–35 units away than elsewhere.

VOL. ix. of the *Bulletin Statistique* has just been published by the International Council for Fishery Investigations. Particular interest attaches to this report, as it deals with the year 1913, the last of a long series during which there has been a continuous, progressive development of the sea-fishing industry in North European countries, and vol. ix. is likely to remain a standard of comparison of two periods, in the interval between which many conditions will be found greatly to have changed. The council has in preparation a Bulletin describing the effect of the war upon the fisheries, and this, it is hoped, will soon be ready. Several changes have been made in the arrangement of the present volume; the use of two languages has been dropped, and the results are now published only in English. There are many useful diagrams. A feature of exceedingly great interest, the estimation of the capital employed industrially, in factories, curing works, etc., in 1913, as well as in the vessels, might be included in the next volume as a help to the understanding of the great change in economic conditions that is now taking place.

THE Tôhoku Imperial University, Sendai, Japan, continues to publish beautifully illustrated memoirs on fossils in the geological series of its Science Reports. In the latest part received (vol. v., No. 1), Mr. I. Hayasaka describes the microscopical structure of three Permian species of the remarkable sponge Amblysiphonella from Japan and China. Prof. H. Yabe also illustrates in three fine plates the microscopical structure of a Tertiary foraminiferal limestone from Borneo.

THE United States Geological Survey has published Professional Papers Nos. 112 and 120, dealing respectively with Cretaceous plant-remains from Tennessee, Mississippi, Alabama, and Georgia, and Cretaceous fish-scales from various American localities. The plant-remains, described by Dr. E. W. Berry, are chiefly leaves of dicotyledons, and represent a lowland coast flora. The sudden appearance of dicotyledons as the dominant plants in Middle Cretaceous times is still a mystery, and Dr. Berry thinks this modern flora may have originated in the Arctic regions. The description of the fish-scales by Prof. T. D. A. Cockerell is a bold attempt to use fragmentary fossils in stratigraphical geology.

PART iii. of vol. iv. of the Records of the Geological Survey of India, which has just reached us, contains a review of the mineral production of India during 1918. Upon the whole the position is satisfactory, most of the important minerals showing an increased production. Thus the coal output rose from 18,212,918 to 20,721,543 tons; it is worth noting that the most substantial increases are shown in the important coalfields of Jharia and Raniganj, which produced respectively 52·85 per cent. and 30·74 per cent. of the total Indian output. The output of iron ore, too, increased, namely, from 413,273 to 492,484 tons, most of which was smelted in the works of the Tata Iron and Steel Co. and the Bengal Iron and Steel Co.; the latter produced also 12,114 tons of ferro-manganese during the year under review. There was a large increase in the production of chromite, mainly through the development of some recent discoveries in the State of Mysore. The output of manganese ore, on the other hand, fell from 591,000 to 518,000 tons, the falling off being probably caused by the difficulties of procuring the necessary shipping facilities. The Bawdwin mine in the Northern Shan States again shows an increase of output, namely, 19,074 tons of lead and 1,970,614 oz. of silver, as against 16,962 tons of lead and 1,580,557 oz. of silver. Gold, on the other hand, declined somewhat, namely, from 574,293 oz. to 536,118 oz. The falling off under this head has, of course, a far less effect upon the prosperity of India than has the increase noted under such minerals as coal and iron, which contribute essentially to the industrial development of the country.

THE oscillations in the luminosity of incandescent electric lamps illuminated by alternating currents forms the subject of a short report by Dr. Luigino Fabaro in the *Atti dei Lincei* (xxviii. (1), 7, 8). The phenomena had been previously studied by Prof. Corbino, and the present experiments refer mainly to certain recent types of lamp. Diagrams are drawn showing the relation between the fluctuations of intensity and those of the electromotive force, and, at the same time, the difference of phase between the luminosity and the exciting electromotive force. These are in conformity with the theory that the effect can be reduced by increasing the mass of the filament.

FROM the Laboratorio di Ottica pratica e Meccanica di Precisione we have received the first numbers of a new periodical, *Rivista d'Ottica e Meccanica di Precisione*. Hitherto Italy has not had a technical periodical on the lines of the German *Zeitschrift für Instrumentenkunde*, and the new journal is a modest attempt to fill the want. Like other countries, Italy has made great progress in the construction of optical and other scientific instruments during the war, and the need for a medium in which matters of interest to practical optical workers can be discussed is now being felt. The November–December number contains articles on Galileo and the pendulum clock, the application of interference methods over simple observations with the naked eye, the first instalment of a paper by P. G. Nutting on "Dispersion

Formulæ for Optical Glass," and a description of the focimeter of the Royal Precision Laboratory, as well as a selection of abstracts from foreign periodicals.

IN an article entitled "The Æther *versus* Relativity" in the January issue of the *Fortnightly Review* Sir Oliver Lodge contends that as the current ideas that the æther is an infinitely extended uniform medium as a whole at rest, and that absolute motion is to be measured with respect to this æther, are simple and straightforward, they should be retained so long as no clear proof that they are false is forthcoming. The new theories express the facts of experience in other terms, but they attribute the property of wave-transmission to geometrical space free from any medium, and are, in consequence, repugnant to those "with a competent faculty for rational philosophising." Sir Oliver Lodge urges the desirability of comparing the speeds of light along and against a strong magnetic field as a promising means of determining the density of the æther. Such a result would entirely discredit the theory of relativity as a statement of real fact.

A REPORT on the general theory of blade-screws, forming Report No. 9 of the American National Advisory Committee for Aeronautics, has been drawn up by Mr. George de Bothezat, of Dayton, Ohio (Washington: Government Printing Office, 1919). In a problem like the present, in which the conditions are far too complex to admit of an exact hydrodynamical solution, any theory necessarily involves assumptions which at best are only approximate. The author applies elemental methods, first, to the slip stream, and, secondly, to the region surrounding a blade element, and, in common with many previous investigations, neglect of the effects of radial motion is one of the assumptions made in a first approximation. The theory appears to constitute an advance on previous investigations, especially in the matter of a detailed examination of the elements of fluid, and the author is very careful in stating the assumptions on which the work is based, and the justification for which will necessarily depend on comparison of the results with those of experiment. An appendix deals with the geometry of screw-blade drawing. The method appears to neglect compressibility, and will therefore be applicable to air-screws of which the tip velocity does not come too near the velocity of sound.

AN important paper on radio-transmission and reception by Mr. J. H. Dellinger has been published by the Bureau of Standards, Washington. The difficulty experienced by practically every man of science in understanding the ordinary radio theory is in mastering the proof of the formula which gives the magnetic force at a distance from the sending antenna in terms of the wave-length of the radiation. He objects to accepting it without proof, and he has not time to puzzle out the intricate theory given by Hertz. Mr. Dellinger gives a rough proof of this formula based on well-known laws. This formula being accepted, the rest of radio theory follows very simply. The formula has been tested in practice many times and found accurate within a small percentage of error. The author makes a theoretical comparison of the relative values of antennæ and closed coils for sending and receiving purposes, and it is shown how the limitations of each follow directly from theory. Although the theory is sufficiently accurate to be a great help in the design of radio stations, yet the necessity for further research, both experimental and theoretical, is urgent, and a long list of such researches is suggested. To everyone desiring a knowledge of the practical theory of radio communication this paper can be recommended.

THE lot of the inventor is always hard unless he is exceptionally placed, and combines commercial with inventive ability. *Engineering* for January 9 points out two ways in which it is becoming increasingly difficult. Experiment is becoming much more costly, and at the same time the protection afforded by the patent laws becomes less and less. Nevertheless, the essential importance of invention from the national point of view is now recognised, and research laboratories are being set up which are to afford every facility for experiment. The success of this movement depends upon getting the inventors into the laboratories, and upon their doing their best work when they are there. But we find that men entering these laboratories are being required to sign away all rights of every kind to any invention they may make. They are to rely solely upon a reward at the discretion of the firm. Our contemporary suggests that a research laboratory should be an independent organisation, financed by the parent firm, but receiving royalties on a liberal scale to be divided among its members by agreement among themselves, and also hints that it may be useless to put forward such a scheme. Apart from the fact that the British business man feels that he is less and less "master in his own house," there is the other point which appeals to research workers, viz. victimisation; he may find himself no longer required in the laboratory, and, after his discharge, may look in vain for his share of the royalties.

Engineering for January 9 contains an article on works management by Mr. F. C. Van Dyke, which will be found to give a very clear discussion of the principles involved. There is a growing tendency to demand that the works manager should be a college-trained engineer, but it is essential that he should have the same practical and varied engineering experience as is required from the self-made man; whatever may have been his initial training, however, mere opportunity without fitness will not produce the successful works manager. The requirements as regards his principles and education may be summarised as consisting essentially of organisation, foresight, co-ordination, supervision or control, and diplomacy. A works manager should recognise that, notwithstanding scientific effort and research, the efficiency given by plant and machines is regulated by human effort, wasteful by instinct, and that to obtain the reduction of such waste it will be necessary to save lost efforts, so that the recovery of waste may add new resources to the community. He must also understand that science in industry will generally be resented by the average worker. Owing to the workers' insufficient knowledge of the economics ruling industry, he believes that the extra profit thereby derived passes to the employer without relative advantage to the worker, and that the efficiency of employees penalises others by unemployment; hence scientific improvements must be introduced with foresight and tact.

AMONG forthcoming books we notice the following: "Wireless Telegraphy, with Special Reference to the Quenched-spark System," B. Leggett; "Aeronautical Engineers," Major A. Graham Clark; "Theory and Practice of Aeroplane Design," S. T. G. Andrews and S. F. Benson; "Physical Chemistry of the Metals," R. Schenk, translated by R. S. Dean; "Manufacture and Uses of Alloy Steels," H. D. Hibbard; and "Mathematics for Engineers," W. N. Rose, vol. ii. (*Chapman and Hall, Ltd.*); "The Principles of Anatomy as Seen in the Hand," Prof. F. Wood-Jones, illustrated; "A Text-book of Organic Chemistry," E. de Barry Barnett, illustrated; and "Laboratory Manual of Elementary Colloid Chemistry," E. Hatschek, illustrated (*J. and A. Churchill*); "Coal Economy: For Steam Users, Engineers, Enginemen, Boiler Firemen, etc.," W. H. Casmey, and "The Mineralogy of the Rarer Metals," Cahen and Wootton, second edition (*C. Griffin and Co., Ltd.*).

THE new list of announcements of *Mr. John Murray* contains many books of scientific interest, *e.g.* "Science and Life: Aberdeen Addresses," Prof. F. Soddy; "Springtime, and Other Essays," Sir Francis Darwin, illustrated (this week); "Splendours of the Sky," Isabel M. Lewis, illustrated; "Conifers and their Characteristics," C. Coltman-Rogers, illustrated; "Life of Sir William White, K.C.B., F.R.S.," F. Manning, illustrated; "New Light on Ser Marco Polo," Prof. H. Cordier (a supplement to Sir Henry Yule's "The Book of Ser Marco Polo"); "The Shibboleths of Tuberculosis," Dr. M. Paterson; "Wild Life in Canada," Capt. A. Buchanan, illustrated; "The Heron of Castle Creek, and Other Sketches of Bird Life," A. W. Rees, with a memoir of the author by J. K. Hudson, illustrated; volumes dealing respectively with Hides and Skins, Rice, and Oil Seed (in the Imperial Institute Reports on Indian Raw Materials), and "Tungsten Ores," R. H. Rastall and W. H. Wilcockson (in the Imperial Institute Monographs on Mineral Resources); also new editions of "The Interpretation of Radium and the Structure of the Atom," Prof. F. Soddy, illustrated; "Microscopy: The Construction, Theory, and Use of the Microscope," E. J. Spitta, illustrated; "Hydrographical Surveying," the late Rear-Admiral Sir W. J. L. Wharton, revised, etc., by Admiral Sir Mostyn Field; "The Soil," Sir A. D. Hall; and "The Small Farm and its Management," J. Long.

OUR ASTRONOMICAL COLUMN.

LARGE FIREBALL ON JANUARY 16.—In the evening twilight of January 16, at 4h. 50m., a fireball was observed from London and other places in the Eastern Counties. It gave a brilliant flash and left a luminous trail which assumed curious forms during fully $5\frac{1}{2}$ minutes. The observations already received of this object are not sufficiently exact or numerous to allow the real path to be trustworthily determined, but the meteor probably had a radiant in Cygnus at about $290^\circ+53^\circ$, and was situated over Lincolnshire. We hope to give more details next week.

In recent years January has proved itself a month in which fireballs are notably abundant. In 1895, on January 16, three large fireballs were observed, and the period from January 12 to 17 seems to have been unusually productive of these brilliant objects.

PROF. W. H. PICKERING'S LUNAR STUDIES.—Prof. W. H. Pickering has for many years made careful studies of various regions of the moon during the whole period of their illumination by the sun. He has traced several cases of notable changes of relative illumination of adjacent regions, some growing brighter, others darkening, as the sun rises higher. *Popular Astronomy* for November contains a number of drawings and photographs of the crater Eratosthenes. The author suggests that the white regions are snow, and the dark regions some low form of vegetation. He imagines that a limited amount of water may remain in certain regions, being held in the soil by capillary attraction. It seems, however, that the phenomena might be otherwise explained by neighbouring regions being formed of different kinds of rock, or even by their being of different degrees of smoothness. Observations of occultations made on the dark limb show with certainty that no refraction occurs exceeding $1''$; those made on the bright limb are less precise, but even there the greatest admissible refraction is some $4''$. Comparing this with the $68'$ of a tangential ray in our atmosphere, we see how exceedingly rare any lunar atmosphere must be. The suggestion of vegetation is perhaps not absolutely impossible, but presents grave difficulties.

With regard to the suggestion made in a publication of the Smithsonian Institution, Washington, D.C., of a rocket to reach the moon, irresistibly recalling the well-known romance of Jules Verne, it seems clear that the propulsive effect of the escaping gases must be trifling beyond the atmosphere. A velocity of seven miles per second would therefore be required at the limits of the atmosphere, and considerably more evidence is needed before this can be admitted as attainable.

THE SOLAR ECLIPSE OF MAY 29, 1919.—The January number of *Conquest* contains an article by Mr. C. R. Davidson, one of the observers of the eclipse at Sobral, Brazil. It is illustrated by many views of the locality, eclipse camp, and instruments, and gives a clear statement of the problem which the expedition was sent to solve, and of the successful result. A deflection of light amounting to $1{\cdot}98''$ at the sun's limb was indicated by the measures, which is close to the value $1{\cdot}75''$ predicted by Einstein. Photography of the corona and prominences was not part of the aims of the expedition; indeed, the author points out that if the observers could have dispensed with these they would gladly have done so, since they veiled some stars near the sun that would have been very useful. However, a good record of the corona was obtained. Its shape is a blend between maximum and minimum types; it would conform more closely to the latter, save for a large streamer at the South Pole. Mr. Davidson and Mr. Woodman directed attention, at the meeting of the R.A.S. on January 9, to the advisability of repeating the observations, with still greater refinement, at the eclipse of September, 1922. They exhibited a model of a simple form of equatorial mounting, suitable for low latitudes, which would obviate the necessity for employing cœlostats. These are admirably adapted for physical researches, but have some defects in a case where extreme precision of position is required.